

WHAT IS CLAIMED IS:

1. A method for changing a location-independent address in a network of nodes, the method comprising:

5 a first node in the network sending a first message, wherein the first message is addressed to the location-independent address, wherein a second node hosts an instance of the location-independent address, wherein the first message comprises a request to host an instance of the location-independent address;

the second node receiving the first message; and

10 the second node sending a response message to the first node, wherein the response message grants permission to the first node to host an instance of the location-independent address.

2. The method of claim 1, further comprising:

15 the first node receiving the response message; and

the first node adding an instance of the location-independent address in response to the response message.

3. The method of claim 2,

20 wherein said first node adding an instance of the location-independent address enables messages addressed to the location-independent address to be sent to the first node.

4. The method of claim 2,

25 wherein the response message indicates that the second node does not give up its instance of the location-independent address;

wherein the first node and the second node each host an instance of the location-independent address after said first node adding an instance of the location-independent address.

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5. The method of claim 4, further comprising:  
a third node sending a second message after said first node adding an instance of the location-independent address, wherein the second message is addressed to the location-independent address; and  
5 the first node and the second node both receiving the second message.
6. The method of claim 2, further comprising:  
the second node giving up its instance of the location-independent address in response to receiving the first message, wherein the response message indicates that the  
10 second node gives up its instance of the location-independent address;  
wherein the second node does not host an instance of the location-independent address after said giving up its instance of the location-independent address;  
wherein the first node hosts an instance of the location-independent address after said adding an instance of the location-independent address.  
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7. The method of claim 6, further comprising:  
a third node sending a second message after said second node giving up its instance of the location-independent address and first node adding an instance of the location-independent address, wherein the second message is addressed to the location-  
20 independent address; and  
the first node receiving the second message, but not the second node.
8. The method of claim 6,  
wherein the first message is propagated from the first node to the second node  
25 via a plurality of intermediate nodes;  
wherein each of the intermediate nodes stores routing information specifying how to route messages addressed to the location-independent address;  
wherein the method further comprises each intermediate node changing its stored routing information so that subsequent messages addressed to the location-  
30 independent address are routed toward the first node instead of toward the second node.

9. The method of claim 8,  
wherein the response message is propagated from the second node to the first  
node via the plurality of intermediate nodes.
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10. The method of claim 8,  
wherein each intermediate node has a plurality of links by which to receive and  
send messages;  
wherein each intermediate node receives the first message by one of its links;  
10 wherein each intermediate node stores routing information specifying a link  
over which to forward the first message;  
wherein said each intermediate node changing its stored routing information  
comprises the intermediate node changing its stored routing information to specify that  
subsequent messages addressed to the location-independent address be forwarded over  
15 the link by which the intermediate node received the first message.
11. The method of claim 10, further comprising:  
each intermediate node storing a message record specifying information  
regarding the first message in response to receiving the first message, wherein the  
20 message record includes information specifying the link by which the intermediate node  
received the first message.
12. The method of claim 11,  
wherein the response message is propagated from the second node to the first  
25 node via the plurality of intermediate nodes;  
wherein the method further comprises each intermediate node:  
retrieving the message record that specifies information regarding the first  
message in response to receiving the response message; and  
determining from the message record the link by which the intermediate node  
30 received the first message.

13. The method of claim 12,  
wherein said storing the message record comprises storing the message record  
in a hash map;

5 wherein the hash map maps a message ID of the first message to the message  
record for the first message.

14. The method of claim 13,  
wherein the response message includes information specifying the message ID  
10 of the first message;

wherein said retrieving the message record that specifies information regarding  
the first message in response to receiving the response message comprises looking up the  
message record using the message ID of the first message.

15 15. The method of claim 14,  
wherein the response message has a message ID that is the same as the  
message ID of the first message;

wherein the information specifying the message ID of the first message  
comprises the message ID of the response message.

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16. The method of claim 1,  
wherein the first node executes client application software and network  
software, wherein said first node sending the first message comprises the network  
software executing on the first node sending the first message in response to a request  
25 received from the client application software executing on the first node;

wherein the second node executes client application software and network  
software, wherein said second node sending the response message comprises the network  
software executing on the second node sending the response message in response to a  
request received from the client application software executing on the second node;

wherein the network software executing on the second node enables the client application software executing on the second node to specify whether to grant permission to the first node to host an instance of the location-independent address.

5     17.         The method of claim 16,

wherein the client application software executing on the second node invokes an application programming interface (API) of the network software executing on the second node to send the response message;

10         wherein said client application software invoking the API of the network software includes the client application software passing one or more parameters specifying whether to grant permission to the first node to host an instance of the location-independent address.

18.         The method of claim 16,

15         wherein the network software executing on the second node also enables the client application software executing on the second node to specify whether the second node is giving up its instance of the location-independent address.

19.         The method of claim 1,

20         wherein the location-independent address comprises a role.

20.         A system comprising:

a network;

25         a plurality of nodes coupled via the network, wherein each node includes a processor and memory;

wherein the plurality of nodes includes a first node operable to send a first message, wherein the first message is addressed to a location-independent address, wherein a second node in the plurality of nodes hosts an instance of the location-

independent address, wherein the first message comprises a request to host an instance of the location-independent address;

wherein the second node is operable to receive the first message and send a response message to the first node, wherein the response message grants permission to  
5 the first node to host an instance of the location-independent address.

21. The system of claim 20,

wherein the first node is operable to receive the response message and add an instance of the location-independent address in response to the response message.

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22. The system of claim 21,

wherein said first node adding an instance of the location-independent address enables messages addressed to the location-independent address to be sent to the first node.

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23. The system of claim 21,

wherein the response message indicates that the second node does not give up its instance of the location-independent address;

wherein the first node and the second node each host an instance of the  
20 location-independent address after said first node adding an instance of the location-independent address.

24. The system of claim 23,

wherein the plurality of nodes includes a third node operable to send a second  
25 message after said first node adding an instance of the location-independent address, wherein the second message is addressed to the location-independent address;

wherein the first node and the second node both receive the second message.

25. The system of claim 21,

wherein the second node is operable to give up its instance of the location-independent address in response to receiving the first message, wherein the response message indicates that the second node gives up its instance of the location-independent address;

5            wherein the second node does not host an instance of the location-independent address after said giving up its instance of the location-independent address;

             wherein the first node hosts an instance of the location-independent address after said adding an instance of the location-independent address.

10    26.        The system of claim 25,

             wherein the plurality of nodes includes a third node operable to send a second message after said second node giving up its instance of the location-independent address and first node adding an instance of the location-independent address, wherein the second message is addressed to the location-independent address;

15            wherein the first node receives the second message, but not the second node.

27.        The system of claim 15,

             wherein the first message is propagated from the first node to the second node via a plurality of intermediate nodes;

20            wherein each of the intermediate nodes stores routing information specifying how to route messages addressed to the location-independent address;

             wherein each intermediate node is operable to change its stored routing information so that subsequent messages addressed to the location-independent address are routed toward the first node instead of toward the second node.

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28.        The system of claim 27,

             wherein the response message is propagated from the second node to the first node via the plurality of intermediate nodes.

30    29.        The system of claim 27,

wherein each intermediate node has a plurality of links by which to receive and send messages;

wherein each intermediate node receives the first message by one of its links;

wherein each intermediate node stores routing information specifying a link  
5 over which to forward the first message;

wherein said each intermediate node changing its stored routing information comprises the intermediate node changing its stored routing information to specify that subsequent messages addressed to the location-independent address be forwarded over the link by which the intermediate node received the first message.

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30. The system of claim 29,

wherein each intermediate node stores a message record specifying information regarding the first message in response to receiving the first message, wherein the message record includes information specifying the link by which the intermediate node  
15 received the first message.

31. The system of claim 30,

wherein the response message is propagated from the second node to the first node via the plurality of intermediate nodes;

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wherein each intermediate node is operable to:

retrieve the message record that specifies information regarding the first message in response to receiving the response message; and

examine the message record to determine the link by which the intermediate node received the first message.

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32. The system of claim 31,

wherein said storing the message record comprises storing the message record in a hash map;

wherein the hash map maps a message ID of the first message to the message  
30 record for the first message.



33. The system of claim 32,  
wherein the response message includes information specifying the message ID  
of the first message;

5 wherein said retrieving the message record that specifies information regarding  
the first message in response to receiving the response message comprises looking up the  
message record using the message ID of the first message.

34. The system of claim 33,

10 wherein the response message has a message ID that is the same as the  
message ID of the first message;

wherein the information specifying the message ID of the first message  
comprises the message ID of the response message.

15 35. The system of claim 20,

wherein the first node executes client application software and network  
software, wherein said first node sending the first message comprises the network  
software executing on the first node sending the first message in response to a request  
received from the client application software executing on the first node;

20 wherein the second node executes client application software and network  
software, wherein said second node sending the response message comprises the network  
software executing on the second node sending the response message in response to a  
request received from the client application software executing on the second node;

25 wherein the network software executing on the second node enables the client  
application software executing on the second node to specify whether to grant permission  
to the first node to host an instance of the location-independent address.

36. The system of claim 35,

wherein the client application software executing on the second node invokes an application programming interface (API) of the network software executing on the second node to send the response message;

5 wherein said client application software invoking the API of the network software includes the client application software passing one or more parameters specifying whether to grant permission to the first node to host an instance of the location-independent address.

37. The system of claim 35,

10 wherein the network software executing on the second node also enables the client application software executing on the second node to specify whether the second node is giving up its instance of the location-independent address.